

## Embedded Multifunctional Optical Sensor System, Phase II

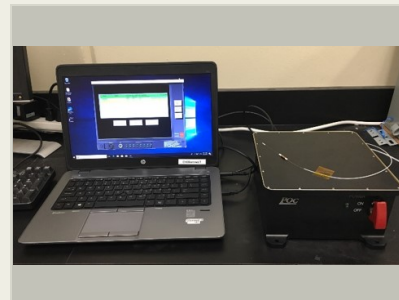
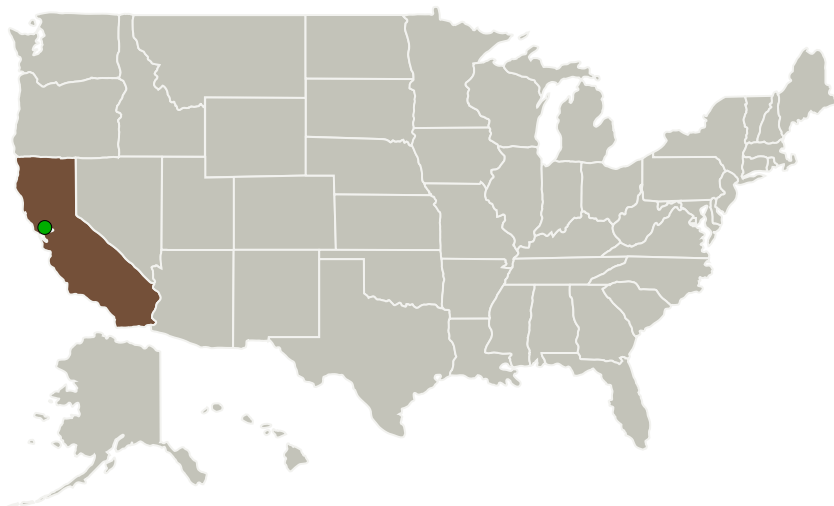
Completed Technology Project (2016 - 2018)



## Project Introduction

Physical Optics Corporation (POC) proposes to continue the development of a novel Embedded Multifunctional Optical Sensor (EMOS) System. The EMOS addresses NASA's need for in situ sensor systems for use on rigid and/or flexible ablative thermal protection system (TPS) materials to measure multiple TPS structural, aerothermal, and aerodynamic response parameters including temperature, heat flux, and pressure. EMOS is based on use of novel materials for high-temperature operation and uniquely designed fiber optic microsensors. The EMOS system is capable of simultaneously measuring multiple TPS response parameters (e.g., pressure, temperature, and heat flux) using a suite of miniature (diameter <400 micron) fiber optic sensors. An EMOS will tolerate operating temperatures >1500 degrees C and measurement errors within 0.4% for temperature sensors, 0.2% for pressure sensors, and 20% for heat flux measurement. The outcome of the Phase I EMOS program was the successful feasibility demonstration of the proposed EMOS technology, capable of operating at temperatures at >1500 degrees C. At the end of Phase II, POC will perform a technology readiness level (TRL)-6 demonstration of the EMOS at POC or at NASA facilities, and will deliver to NASA a fully operational EMOS system prototype.

## Primary U.S. Work Locations and Key Partners



Embedded Multifunctional Optical Sensor System, Phase II

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Organizations Performing Work	Role	Type	Location
Physical Optics Corporation	Lead Organization	Industry	Torrance, California
● Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

## Primary U.S. Work Locations

California

## Project Transitions

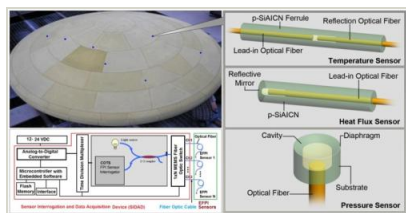
▶ **April 2016:** Project Start

✓ **July 2018:** Closed out

## Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139512>)

## Images



## Briefing Chart Image

Embedded Multifunctional Optical Sensor System, Phase II  
(<https://techport.nasa.gov/image/132436>)



## Final Summary Chart Image

Embedded Multifunctional Optical Sensor System, Phase II  
(<https://techport.nasa.gov/image/133331>)

## Organizational Responsibility

## Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

## Lead Organization:

Physical Optics Corporation

## Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

## Program Director:

Jason L Kessler

## Program Manager:

Carlos Torrez

## Principal Investigator:

Richard Mann

## Co-Investigator:

Naibing Ma

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### Technology Maturity (TRL)

Start: **4**  
Current: **6**  
Estimated End: **6**



### Technology Areas

#### Primary:

- TX09 Entry, Descent, and Landing
  - └ TX09.4 Vehicle Systems
    - └ TX09.4.6 Instrumentation and Health Monitoring for EDL

### Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System